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NPIC/TSSG/PPS-202-68  
30 August 1968

MEMORANDUM FOR: Executive Director, NPIC

SUBJECT: High Precision Stereo Comparator Performance  
Specifications History

REFERENCE: Memorandum for the Record; Subject: Report of West  
Coast Trip the Week of 23-28 June 1968; Dated  
29 July 1968; Written by  PPBS

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1. In a meeting which you convened to discuss the observations made in the referenced trip report, you requested that TSSG provide historical information concerning the High Precision Stereo Comparator specifications.

2. I have had a review performed of the documentation available on this subject and a folder prepared containing the applicable documentation with tabs to indicate pertinent citations. This information is quite extensive and since you may wish to see the context in which it is presented, many of the entire documents are furnished. For this reason it was not feasible to make duplicate copies so it will be necessary to route them sequentially to the remaining members of the meeting when you have completed your review.

3. Following is an index to the tabs numbered 1 - 8:

Tab 1

Reference: Preliminary Design Specifications for High  
Precision Stereocomparator, dated 14 September  
1964, page 1.

Comments: The accuracy statement on these preliminary  
design specifications constitutes the earliest  
documentation on this subject that we have on  
file. In spite of the inconsistency in the  
dates, it is apparently the attachment refer-  
enced in the TID Memorandum, No. 187/64, dated  
11 September 1964, concerning the High Precision  
Stereo Comparator.

Declass Review by  
NIMA/DOD

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Tab 2

**Reference:** Report on Orientation and Briefing Meeting, dated October 30, 1964, page 1.

**Comments:** The information in this report shows coordination with TID representatives and a technical consultant, [redacted], a mechanical engineer who is an authority on metrology and related subjects.

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Tab 3

**Reference:** Development Objective - High Precision Stereo Comparator, dated 12 February 1965, page 4.

**Comments:** This specification was from the development objective that was sent to industry and used as the basis for the feasibility study.

Tab 4

**Reference:** Technical Specifications for a High Precision Stereo Comparator, TAB B to a paper entitled "High Precision Stereo Comparator," dated 8 June 1966, page 6.

**Comments:** This information, extracted from an extensive analysis performed by [redacted] indicates the total error budget for the comparator.

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Tab 5

**Reference:** Same as Tab 4 above, page 4.

**Comments:** This is a brief discussion of the accuracy requirement by [redacted]. The "least count" desired was determined to be one-tenth of a micron.

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Tab 6

**Reference:** Same as Tab 4 above, Staff Study on High Precision Stereo Comparator, dated 8 June 1966, page 1.

**Comments:** This entry indicates the requirement for a measurement resolution (not accuracy) as small as  $\frac{1}{4}$  micron. The term resolution here should be considered as synonymous with the term "least-count".

Tab 7

**Reference:** Justification Statements for FY-1967 R&D Projects, page 2.

**Comments:** This entry indicates some of the specific mensuration requirements upon which the accuracy requirement was based.

Tab 8

**Reference:** Dimensional Metrology, page 237.

**Comments:** This is a portion of the discussion in this publication concerning the rule of thumb that measuring instruments should be ten times as accurate as the required accuracy for the part to be measured. The complete discussion of this principle can be obtained from [redacted]

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Tab 9

**Reference:** Negotiated Contract between U.S. Government and [redacted] for High Precision Stereo Comparator, signed 5 April 1968; last page.

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Comments: The highlighted paragraph referenced to page 53 of the Scope of Work statement indicates the negotiated "Maximum RMS absolute error of coordinate measuring system..." This is the current performance accuracy specification for the comparator. The established least count specification remains as one-tenth of a micron.



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Chief, Technical Services and Support Group, NPIC

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